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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/763,394	07/02/2001	Shinichi Sugihara	564131/0016	5266

7590 11/29/2001  
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EXAMINER

JOHNSON, EDWARD M

ART UNIT PAPER NUMBER

1754

DATE MAILED: 11/29/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/763,394

Applicant(s)

SUGIHARA, SHINICHI

Examiner

Edward M. Johnson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 40-79 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40-79 is/are rejected.
- 7) ☒ Claim(s) 57 and 74-79 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Specification***

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 250 words. It is important that the abstract not exceed 250 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The abstract of the disclosure is objected to because the term, "said" is used in lines 2 and 7. Correction is required. See MPEP § 608.01(b).

***Claim Objections***

3. Claims 74-79 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The claims contain only use limitations, which do not limit a method for making a catalyst.

Claim 57 is objected to because of the following informalities: the phrase, "light characterized by comprising" appears to be incorrect. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 40-79 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of

the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 40 recites the broad recitation "visible light", and the claim also recites "at least in the wavelength region of about 400-600 nm" which is the narrower statement of the range/limitation.

Claim 40, line 3, "the wavelength region" lacks antecedent basis.

Claims 40-79, "the irradiation" lacks antecedent basis.

Claim 41, "the anatase type or the rutile type" lacks antecedent basis.

Claim 42, "the primary particle size" lacks antecedent basis.

Claim 43, "those" is unclear as to what is being referred to.

Claim 44, "the peak area", "the 1s electrons", "the bonds", and "the 2p electrons" all lack antecedent basis.

Claim 44, line 4, "that assigned" is unclear as to what is being referred to.

Claims 44-46, "(O1s/Ti2p)" is unclear as to meaning and whether the limitation is part of the claimed invention.

Claims 45-46, "said area ratio" lacks antecedent basis.

Claim 47, "the ESR", "the g value of from 2.003 to 2.004 above", and "the wavelength region" all lack antecedent basis.

Claim 47, line 4, "it" is unclear as to what is being referred to.

Claim 48, "which" is unclear as to what is being referred to.

Claims 49, 52, 55, 58, and 65-66, "titanium oxide-zirconium oxide based" and "silicon oxide-titanium oxide based" are unclear as to whether the limitations are listed in the alternative.

Claims 50 and 53, "which comprises" is unclear as to what is being referred to. Examiner suggests --said method comprising--.

Claim 50, "the intrusion of air" and "the treatment system" both lack antecedent basis.

Claims 51 and 54, "the vacuum degree" and "the tightly sealed system" both lack antecedent basis.

Claims 52, 55, and 58 appear to contain improper Markush groups. Examiner suggests replacing "or" with --and--.

Claims 53 and 56-57, "characterized by" is unclear as to what is being referred to.

Claim 53, "the intrusion of air" and "the treatment system" both lack antecedent basis.

Claims 62-64, "which was produced" is unclear as to what is being referred to.

Claim 71, "thin-film like" and "sheet-like" are both indefinite as to the extent to which the claimed material resembles a thin film or sheet.

Claim 74, "comprising" is unclear as to what is being referred to. Examiner suggests --said method comprising--.

Claims 74-75, "the substance to be decomposed" lacks antecedent basis and/or appears redundant. Examiner suggests --the substance--.

Claims 74-75, line 3, "the irradiation" lacks antecedent basis.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

7. Claims 40-49 are rejected under 35 U.S.C. 102(e) as being anticipated by Mouri et al. 5,872,072.

Regarding claim 40, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract and column 5, lines 41-42), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NO<sub>x</sub> reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11).

Regarding claim 44, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NO<sub>x</sub> reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11). The bonding properties of the orbitals are considered to be stable and inherent properties over 1 week because the same stable compound comprising the same elements of the Periodic Table is disclosed.

When the examiner has reason to believe that the functional language asserted to be critical for establishing novelty in claimed subject matter may in fact be an inherent characteristic of the prior art, the burden of proof is shifted to Applicant to prove that the subject matter shown in the prior art does not



possess the characteristics relied upon. In re Fitzgerald et al.  
205 USPQ 594.

Regarding claim 47 Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NO<sub>x</sub> reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11). The ESR measurements are considered to be inherent properties of titanium dioxide because the same stable compound comprising the same elements of the Periodic Table is disclosed.

Regarding claim 49, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract and column 5, lines 41-42), as semiconductors (abstract; semiconductors have stable oxygen defects), and titanium, zirconium, or hafnium (see column 4, lines 8-10).

Regarding claims 41 and 43, Mouri '072 discloses anatase and rutile type photocatalyst (see column 5, lines 55-57).

Regarding claim 42, Mouri '072 discloses particle size of about 0.01-25 microns (see column 5, lines 65-66).

Regarding claims 45-46, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract), as semiconductors (abstract; semiconductors have stable oxygen

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defects) exhibiting NOx reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11). The bonding properties of the orbitals are considered to be stable and inherent properties over 1 week because the same stable compound comprising the same elements of the Periodic Table is disclosed.

Regarding claim 48, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NOx reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11). The ESR measurements are considered to be inherent properties of titanium dioxide because the same stable compound comprising the same elements of the Periodic Table is disclosed.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. Claims 50-79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips 5,989,648 in view of Mouri '072.

Regarding claims 50 and 53, 56-57 Phillips '648 discloses a method of producing titanium oxide catalytic materials (see abstract and column 1, lines 43-44) comprising activating with hydrogen and argon plasma (see column 1, lines 54-56, column 2, lines 60-64 and column 4, line 62-64), and operation at 1 Torr (see column 4, lines 36-37; substantially free from air compared to a volume at atmospheric pressure).

Phillips '648 fails to disclose a semiconductor.

Mouri '072 discloses a semiconductor.

It is considered that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the semiconductor of Mouri in the titanium dioxide catalyst making process of Phillips because Mouri discloses semiconductor in the form of titanium dioxide (see abstract, column 3, lines 41-43, and column 5, lines 42 and 50-59) for efficient removal of malodorous components with or without light irradiations (see column 3, lines 25-27, 42, and 52-53).

Regarding claims 51 and 54, 57 Phillips '648 discloses operation at 1 Torr (see column 4, lines 36-37; substantially free from air compared to a volume at atmospheric pressure).

Regarding claims 52 and 55, 58, 65-66, Phillips '648 discloses titania (see column 4, lines 20-21).

Regarding claims 59-60, Mouri '072 discloses anatase and rutile type photocatalyst (see column 5, lines 55-57).

Regarding claim 61, Phillips '648 discloses discloses operation at 1 Torr (see column 4, lines 36-37) and temperatures on the order of 3000 K (see column 5, lines 15-18).

Regarding claims 62-64, Phillips '648 discloses a method of producing titanium oxide catalytic materials (see abstract and column 1, lines 43-44) comprising activating with hydrogen and argon plasma (see column 1, lines 54-56, column 2, lines 60-64 and column 4, line 62-64), and operation at 1 Torr (see column 4, lines 36-37; substantially free from air compared to a volume at atmospheric pressure). Mouri '072 discloses a semiconductor.

Regarding claims 67-69, Phillips '648 discloses reduction (see column 1, lines 55-56).

Regarding claim 71, Phillips '648 discloses thin films (see column 1, lines 56-60). Mouri '072 discloses granular and sheet form (see column 12, lines 15-20).

Regarding claims 70, 72, and 74-79, Phillips '648 discloses a method of producing titanium oxide catalytic materials (see abstract and column 1, lines 43-44) comprising activating with hydrogen and argon plasma (see column 1, lines 54-56, column 2,

lines 60-64 and column 4, line 62-64), and operation at 1 Torr (see column 4, lines 36-37; substantially free from air compared to a volume at atmospheric pressure). Mouri '072 discloses a semiconductor. Use limitations are not considered to further limit a method for producing a catalyst. However, Mouri '072 discloses sheets, bags, and woven or nonwoven fabrics (see column 12, lines 25-37).

### ***Conclusion***

10. Applicant is advised that should claim 59 be found allowable, claim 60 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ogata 6,107,241 discloses a photocatalytic body comprising titanium dioxide and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths, treatment of titanium dioxide semiconductors (see column 1, lines 11-15), rutile or anatase type (see column 2, lines 8-12), and a wavelength of 440 nm (see column 6, lines

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33-35); Hums 4,847,234 discloses a method for making a plate-like catalyst comprising titanium dioxide and treatment with argon-hydrogen plasma (see column 3, lines 34-40).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward M. Johnson whose telephone number is 703-305-0216. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin can be reached on 703-308-1164. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

EMJ  
November 13, 2001

  
STEVEN P. GRIFFIN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700